# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/587,394 | 06/05/2000 | Raoul Florent | PHF 99,548 | 8430 |

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| 24737 7590 01/26/2005 | | EXAMINER |
| PHILIPS INTELLECTUAL PROPERTY & STANDARDS | | PATEL, SHEFALI D |
| P.O. BOX 3001 | | |
| BRIARCLIFF MANOR, NY  10510 | ART UNIT | PAPER NUMBER |
| | 2621 | |

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

|  | Application No. | Applicant(s) |  |
|---|---|---|---|
| **Office Action Summary** | 09/587,394 | FLORENT, RAOUL |  |
|  | Examiner | Art Unit |  |
|  | Shefali D Patel | 2621 |  |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _17 December 2004_.

2a)☐ This action is **FINAL**.    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _16-28_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _29_ is/are allowed.

6)☒ Claim(s) _16-18, 20 and 28_ is/are rejected.

7)☒ Claim(s) _19 and 21-27_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

U.S. Patent and Trademark Office

PTOL-326 (Rev. 1-04)      Office Action Summary      Part of Paper No./Mail Date 01212005

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1.       A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR

1.17(e), was filed in this application after final rejection.  Since this application is eligible for continued

examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the

finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.  Applicant's

submission filed on December 17, 2004 has been entered.

### *Response to Arguments*

2.       Applicant's arguments, see pages 10-12 of Remarks, filed on December 17, 2004, with respect to

the rejection(s)of claim(s) 18-20, 26-27, and 29 under 35 U.S.C. 112 2nd paragraph and the rejection of

claims 16-17 and 28 under 35 U.S.C. 102(b) with regard to Ito (US 5,067,166) have been fully considered

and are persuasive.  Therefore, the rejection has been withdrawn.  However, upon further consideration, a

new ground(s) of rejection is made in view of Sethian in combination with Cohen.

### *Claim Rejections - 35 USC § 103*

3.       The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains.  Patentability shall not be negatived by the
> manner in which the invention was made.

4.       Claims 16-18, 20, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sethian

("A fast marching level set method for monotonically advancing fronts, " Applied Mathematics, 1996) in

combination with Cohen et al. (hereinafter, "Cohen") ("Global Minimum for Active Contour Models: A

minimal Path Approach," IEEE, 1997).

        With regard to **claim 16** Sethian discloses an image processing method of extracting points of a

path following a threadlike structure in an image formed by a grid of potential points (page 1592, column

2 lines 10-16), comprising: Marching a front of points forward starting at a predetermined start point (i.e., smaller values) until a predetermined end point (i.e., larger values) of a grid is reached to thereby identify at least one track formed by succeeding points denoted fathers and corresponding children of the threadlike structure (the threadlike structure is seen in Fig. 4 on page 1593, see, page 1593 column 1 last paragraph to column 2).

However, Sethian does not expressly disclose back propagating the front along a first track starting at the end point through the children and the fathers of the first track until the start point is reached whereby the points of the path following the threadlike structure in the image are extracted.

Cohen discloses back propagating the front along a first track starting at the end point through the children and the fathers of the first track until the start point is reached whereby the points of the path following the threadlike structure in the image are extracted (page 16 section 3.5.2).

Please note that Cohen incorporates Sethian's method of 'marching a front of points forward...'' in section 3.4.4 on pages 14-15.

Sethian and Cohen are combinable because they are from the same field of endeavor, i.e., image processing for threadlike structure. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Cohen with Sethian. One of ordinary skill in the art would have been motivated to have the processing step of Cohen for back propagating to select the best path so that the access path with the minimum distance can be detected relatively fast by determining best and minimal path as suggested by Cohen (sections 3.2, 3.3. and 3.5 and also first full paragraph on top of page 17). Therefore, it would have been obvious to combine Cohen with Sethian to obtain the invention as specified in claim 16.

With regard to **claim 17** Sethian discloses the marching the front of points forward starting at the predetermined start point until the predetermined end point of the grid is reached includes: conditionally

selecting a first child of the grid to succeed a first father of the grid (see section 2 titled "Marching Forward" on page 1593 column 2).

With regard to **claim 18** Sethian discloses the first child conditionally selected in accordance with a location for the first father that pertains to the front (see section 2 titled "Marching Forward" on page 1593 column 2), and Cohen discloses a first cumulated cost for the first that is minimal compared to other points of the front (page 10 section 3.4.1 second paragraph).

With regard to **claim 20** Cohen by way of referencing Sethian discloses the first child conditionally selected in accordance with a filiation that determines the first child becomes a possible second father of the front for further forwarding the front (see Figure 1 of Cohen and also section 3.4.4 on pages 14-15).

**Claim 28** recites identical features as claim 16 except claim 28 is a system claim. Thus, arguments similar to that presented above for claim 16 is equally applicable to claim 28. Please note that Cohen discloses an algorithm to execute the method disclosed in section 6 on page 24.

*Allowable Subject Matter*

5.      Claim 29 is allowed.

The instant invention defines an image processing system of performing a path-tracking operation to extract points of a threadlike structure in an image formed of a grid of potential points. Cohen discloses these features of "cost" and "city block distance" in section 3.4.1 on pages 10-12, Figure 1. However, the claimed invention distinguishes over the prior art by the manner in which a location for the second point (child), which must be on the same row or column of the grid (city block distance) as the first point (father) with one grid pint interval, and a criterion of cost referred to as cumulated costs for said second point (child) which must be minimal compared to cumulated costs obtained with other possible first points (fathers). The prior art of record fails to teach this distinguished feature stated above. These

elements in combination with all of the other elements of the claims are not taught or fairly suggested in

the prior art of record.

6.      Claims 19, 26-27, and 21-25 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

The closest prior art to Ito is directed to an image processing method of extracting points of a path

following a threadlike structure in an image formed by a grid of potential points as disclosed in an

independent claims 16 and 28.  However, the closest prior art fails to disclose wherein the first child is

conditionally selected in accordance with a location for the first child that is on a same row or a same

column of the grid as the first father with a one grid point interval, and a second cumulated cost for the

first child including a first term of a minimum among cumulated cost for the succeeding points already

selected from the start point to the first father and a second term of the potential at the first child as

disclosed in claim 19.  Further, the closest prior art fails to disclose anything about a function of

cumulated costs associated with the first chilled being calculated as a potential mean value by the

equation recited in claim 21 where k is the total number of current pints between the start point and the

first child, $Q_j$ are the potentials at the current points located between the start point and the first child,

and $L_k$ is the length of a path between the start point and the first father calculated using a city block

distance law as disclosed in claim 21.  Ever further, the closest prior art fails to disclose anything about a

curvature value ($K_k$) at the first child along the first track is derived from a turning angle value which is

defined as an angle between the tangent to the track at the first child and a reference axis so that a term

based on the curvature value ($K_k$) is taken into account to calculate the function ($CC_k$) of cumulated

costs in order to penalize track trajectories having too many points associated to important curvature

values as disclosed in claim 26.  It is for these reasons in combination with all the other elements of the

claim that claims 19, 21, and 26 would be allowable if rewritten in independent form including all of the

limitation of the base claim and any intervening claims. Claims 22-25 and 27 are allowable for the same

reason as claims 21 and 26.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should

be directed to Shefali D Patel whose telephone number is 703-306-4182. The examiner can normally be

reached on M-F 8:00am - 5:00pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H

Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this

application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Shefali D Patel
Examiner
Art Unit 2621

January 21, 2005

BRIAN WERNER
PRIMARY EXAMINER